

U.S. Patent Application Serial No. **10/757,453**
Amendment filed February 2, 2006
Reply to OA dated November 3, 2005

REMARKS

Claims 1-8 are pending in this application. Claim 1 is amended herein. Upon entry of this amendment, claims 1-8 will be pending. Entry of this amendment and reconsideration of the rejections are respectfully requested.

No new matter has been introduced by this Amendment. Support for the amendments to the claims is discussed below.

Claims 1-8 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

(Office action paragraph no. 1)

The Applicants have amended claim 1 for clarity, in accordance with the Examiner's suggestions, replacing the phrase "in which fuel is adapted to flow" by --which is adapted for the flow of fuel--. Reconsideration of the rejection is therefore respectfully requested.

Claims 1-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nishino et al. (U.S. Patent No. 6,089,278) in view of Nishi et al. (U.S. Publication No. 2002/0104575 A1).

(Office action paragraph no. 2)

The rejection of claims 1-8 is respectfully traversed, and reconsideration of the rejection is requested.

In the rejection, the Examiner states that: "Nishino et al. fail to teach that the fluororesin forming the inner layer has a functional group ... One of ordinary skill in the art would have

recognized that an adhesive functional group is added to a fluororesin . . . as taught by Nishi et al." That is, the rejection is based on the addition of Nishi's adhesive functional group to Nishino's fluororesin. However, Applicant respectfully submits that there is no suggestion or motivation in the cited references for the proposed modification of the references, and that no *prima facie* case of obviousness can be made using the cited references. Applicant first reviews the teachings of the references, and then argues against the proposed combination.

(1) Regarding Nishi et al. '575

The Nishi et al. patent publication relates to a hose having a two layer structure comprising an inner layer made of a fluororesin having adhesive functional groups and an outer layer adjacent thereto, made of a thermoplastic resin such as a polyamide resin.

Nishi et al. '575 describes in the BACKGROUND ART section that a hose of a three layer structure wherein a layer of an adhesive is interposed between an inner layer and an outer layer **has many problems due to the use of an adhesive**. Specifically, Nishi et al. '575 states:

"the fluororesin is, by its nature, a material having a low adhesive property, and even if it is attempted to fuse a tube of a fluororesin directly to the base material of the outer layer, no adequate bond strength is obtainable. ... Under these circumstances, an attempt has been made to make a hose of a three layer structure wherein a layer of an adhesive is interposed between an inner layer of a fluororesin and an outer layer of a polyamide resin. However, as compared with a fluororesin, such an adhesive is inadequate in chemical resistance, water resistance and heat resistance, ... Further, from the viewpoint of the production process, in order to use an adhesive, a step of surface treatment of the fluororesin or a step for primer treatment has been required in many cases. Further, a step of laminating an adhesive is required, thus leading to a high cost." (Please see paragraph [0006], line 5 to [0008], line 10 of Nishi et al. '575)

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In addition, Nishi et al., in order to solve such problems due to the use of an adhesive, states, "It is an object of the present invention to provide a fuel hose which has a double layer structure excellent in interlaminar adhesion **without using an adhesive** and comprising an inner layer made of a fluororesin having an antistatic function and an outer layer adjacent thereto, and which can be mounted on an automobile, preferably without bending." (Please see paragraph [0010] of the Nishi et al. patent. Emphasis added)

Furthermore, in Example 1 of the Nishi et al. patent (paragraphs [0025] to [0100]), wherein an adhesive was not used, to a cylinder to form an outer layer of a hose, polyamide 12 was supplied. Further, to a cylinder to form an inner layer, a mixture comprising a powder of ETFE, maleic anhydride, t-butyl hydroperoxide and carbon black was supplied, to form resin C. A laminated hose having a double layer structure was formed by two layer co extrusion.

Similarly, in Example 2, to a cylinder to form an outer layer of a hose, the same polyamide 12 was supplied. Further, to a cylinder to form an inner layer, pellets 2 comprising a powder of ETFE, maleic anhydride, t-butyl hydroperoxide and carbon black were supplied. A laminated hose having an outer diameter of 8mm and an inner diameter of 6 mm was formed by two layer co extrusion. Examples of producing a laminated hose having a double layer structure are also described in Examples 3, 4 and 5 in a similar fashion.

As described above, Nishi et al. relates to a hose having a two layer structure, and teaches that a hose of a three layer structure wherein a layer of an adhesive is interposed between two layers has the

above-mentioned problems arising from the use of an adhesive and thus the realization of such a hose is difficult.

(2) Regarding the Nishino et al. '278 patent

Nishino et al. relates to "an automotive fuel hose comprising an inner layer comprising a fluoro-resin, a low fuel permeability layer provided about an outer peripheral surface of the inner layer comprising a polyester resin having a naphthalene ring such as polybutylene naphthalate, and an adhesive layer for bonding the inner layer and the low fuel permeability layer". Regarding the adhesive layer, the Nishino et al. patent discloses that in cases where the innermost layer is composed of a fluorine type resin and the middle layer is composed of a polyalkylene naphthalate resin, the adhesive resin to be used as the adhesive layer between the innermost layer and the middle layer may be a melted mixture including fluorine type resins and crystalline polyester type resins (column 9, lines 27 to 37, of the Nishino et al. patent). However, a mixture of a polyamide type resin and a crystalline polyester type resin is not exemplified here. The mixture of a polyamide type resin and a crystalline polyester type resin may be used as the adhesive resin in cases where the innermost layer is composed of a polyamide type resin (column 9, line 49 to column 10, line 5 of the Nishino et al. patent). Namely, in cases where the innermost layer is composed of a polyamide type resin and the middle layer is composed of a polyalkylene naphthalate resin, the adhesive resin to be used as the adhesive layer between the innermost layer and the middle layer may be, preferably, one or more kinds of thermoplastic polyurethanes, polyetherblockamides, polyesterblockamides, modified polyolefins,

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polyester copolymers, and polyester type elastomers (column 9, lines 49 to 57, of the Nishino et al. patent). In addition, the Nishino et al. patent discloses that a composition obtained by melt-mixing a polyamide type resin and a crystalline polyester type resin and/or a polyester type elastomer may be alternatively be used as the adhesive resin (column 9, lines 58 to 61). It is apparent that the adhesive layer here is the adhesive layer between the innermost layer composed of a polyamide type resin and the middle layer composed of a polyalkylene naphthalate resin. Namely, because the term "the above-mentioned melted mixture" (column 9, line 42) indicates "a melted mixture" (column 9, line 32), "the adhesive resin" (column 9, line 61) indicates the adhesive resin to be used as the adhesive layer between the innermost layer composed of a polyamide type resin and the middle layer composed of a polyalkylene naphthalate resin (column 9, lines 49 to 57), and does not indicate the adhesive resin to be used as the adhesive layer between the innermost layer composed of a fluorine type resin and the middle layer composed of a polyalkylene naphthalate resin (column 9, lines 27 to 48).

3. Arguments regarding the combination of Nishino et al. and Nishi

As noted above, the Examiner states: "Nishino et al. fail to teach that the fluororesin forming the inner layer has a functional group ... One of ordinary skill in the art would have recognized that an adhesive functional group is added to a fluororesin ... as taught by Nishi et al."

However, the present invention relates to "an automotive fuel hose, which comprises: an inner layer comprising a fluororesin having a functional group; a low fuel permeability layer provided about an outer peripheral surface of the inner layer; and an adhesive layer for bonding the inner layer and the

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low fuel permeability layer comprising a blend of polyamide resin and polyester resin” (Claim 1 of the present invention).

In contrast, the Nishi et al. patent relates to a laminated hose having a double layer structure, and suggests that a hose of a three layer **structure wherein a layer of an adhesive is interposed** between an inner layer and an outer layer **has many problems**, and thus the realization of such a hose is difficult. This teaching does not provide a suggestion for the Examiner's proposed modification, and, in fact, **teaches away** from a combination of the teachings of the Nishi et al. patent with the teachings of the Nishino et al. patent, wherein the adhesive layer is interposed between the innermost layer and the middle layer.

The Nishino et al. patent relates to a laminated hose having an adhesive layer as stated above. However, the Nishino et al. patent describes a case, as in the case of the present invention, where the inner layer (innermost layer of the Nishino et al. patent) is composed of a fluororesin and the low fuel permeability layer (middle layer of the Nishino et al. patent) is composed of a polyester resin having a naphthalene ring (polyalkylene naphthalate of the Nishino et al. patent), the adhesive resin to be used as the adhesive layer between the two layers may be a melted mixture including fluorine type resins and crystalline polyester type resins. Further, the Nishino et al. patent describes that a blend of polyamide resin and polyester resin to be used as the adhesive resin in the present invention is employed **where the inner layer is composed of a polyamide resin, not a fluororesin**. Therefore, there is no

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suggestion or motivation in Nishino for a hose wherein an inner layer is composed of a fluororesin and the adhesive layer is composed of a blend of polyamide resin and polyester.

In addition, the Nishino et al. patent does not teach or suggest the fluororesin having a functional group used for the inner layer as described in the present invention.

Applicant therefore submits that claims 1-8 are not obvious over Nishino et al. and Nishi et al., taken separately or in combination.

In view of the aforementioned amendments and accompanying remarks, the claims, as amended, are in condition for allowance, which action, at an early date, is requested.

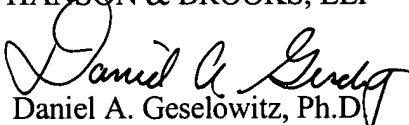
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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